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EXAMINER	
GREEN, RICHARD R	

ART UNIT	PAPER NUMBER
3644	

MAIL DATE	DELIVERY MODE
12/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,328	MUHLTHALER ET AL.	
	Examiner	Art Unit	
	Richard R. Green	3644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-22,25 and 27-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-22,25 and 27-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 September 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings were received on 9/3/2009. These drawings are acceptable.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim **32 is** rejected under 35 U.S.C. 102(b) as being anticipated by USPN-2499736 to Kleen.

Regarding claim **32,** Kleen teaches in fig. 6 an aircraft having a cooling device ("refrigerating system," col. 1, line 44) for expelling heat from a heat source located in the interior of an aircraft ("cargo space," col. 1, line 55) to a heat sink ("low-temperature ambient air," col. 2, lines 18-19), comprising:

a piping system sealed against the surrounding atmosphere ("hermetically confined within a closed circuit or tube" col. 1, lines 48-50), the piping system having a heat intake section 12 ("vaporizing zone," col. 1, line 52) thermally coupled with the heat source ("thermally associated," col. 1, line 52), a heat output section 11 thermally coupled with the heat sink, and an essentially adiabatic conveyance section located there between ("intermediate connecting section 13," col. 2, lines 47-48; fig. 1), whereby the piping system is filled with a heat conveyance medium ("vaporizable refrigerating

medium or agent," col. 1, lines 48-49) which, when heat is received in the heat intake section from the heat source, undergoes a transition from the liquid phase to the gaseous phase, then flows into the heat output section, then condenses when discharging heat to the heat sink, and then flows back into the heat intake section (col. 3, lines 10-17);

wherein said heat sink includes a section of an external wall of the aircraft (fig. 6: the ambient air which vents through the cooling device of Kleen is the primary heat sink in the device, however a thermal couple exists between the distal end of pipe 11 and the exterior skin of the aircraft, where it is connected to the metallic skin by a metallic support–see MPEP 608.02(ix) for reference of materials indicated by cross hatching– and necessarily heat transfer will take place between the heat output pipe 11 and the skin of the aircraft; it is also inevitable that some heat transferred to the ambient air will be transferred back to the mouth of the exit vent, heating it, and in that manner, the section of the external wall of the aircraft around the exit of the vent duct between numerals 32 and 33 and is included in the heat sink as well; additionally, structurally the heat sink includes the duct 31 which includes some exterior surfaces of the aircraft);

at least one heat exchanger which operatively couples the piping system to one of the heat source and the heat sink, thereby to cause heat transfer in at least one of the heat intake section and the heat output section, respectively (fig. 6, at 14 and 17; col. 2, lines 52-55 teach that fins 14 act as heat exchangers for the condenser, and col. 3, lines 7-9 teach that fins 17 are heat exchangers for the evaporator); and

a ventilator operatively connected to said at least one heat exchanger, the ventilator controlling the transfer of heat between said at least one heat exchanger and said heat source (fig. 6; ventilator may be considered as duct 31, which introduces fresh air through vent 32 and expels heated air through vent 33; col. 6, lines 44-71 teach how this is controlled by operation of the shutters of vent 32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **19-22, 25 and 27-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN-5513500 to Fischer et al. in view of USPN-6658881 to Plattner.

Regarding claims **19 and 32,** Fischer et al. teach in fig. 1 an aircraft 1 with a liquid cooling system (fig. 2) for expelling heat from a heat source 8A located in the interior of the aircraft to a heat sink (either 4 or 41), comprising:

a piping system (5, 5', 6, 6', 10A, 10B, 11A, 11B) sealed against the surrounding atmosphere (col. 4, lines 41-42: at least supply 5 and return 6 conduits are insulated);

the piping system having a heat intake section 9A thermally coupled with the heat source 8A and a heat output section 4' thermally coupled with the heat sink (4 or 41) and an essentially adiabatic conveyance section (5', 6') located therebetween;

whereby the piping system is filled with a heat conveyance medium (col. 4, lines 22-24: "simple liquid coolant"; lines 37-38: "water/glycol mixture") which flows from the heat output section to the heat intake section;

wherein the heat sink includes a section of an external wall of the aircraft (col. 5, lines 43-50; heat output section 41 is a skin heat exchanger);

at least one heat exchanger which operatively couples the piping system the heat source (heat exchanger 9A couples the piping system to the heat source 8A; col. 5, lines 25-50 teach that a heat exchanger is present at 4' and 41), thereby to cause heat transfer in the heat intake section;

a ventilator (13A or 15) operatively connected to the heat exchanger (9A OR 4') and adapted to control the transfer of heat between the exchanger and the heat source (col. 5, lines 8-10, lines 16-20, 61-65 discuss control of ventilators 13A and 15 to transfer heat);

a temperature sensor 45 located adjacent the heat source so as to detect the temperature thereof and operatively connected to the cooling device so that the device may respond to the temperature detected (fig. 2; col. 5, line 65 – col. 6, line 1; the sensor 45 is shown to be located inside the heat exchanger 9A, which is itself a heat source, and inside the galley 3A, but which is also considered to be adjacent to the heat source 8A);

a regulator valve 7 operatively connected to the piping system, thereby to control the quantity of heat conveyance medium flowing to or from the heat exchanger (col. 5, lines 34-36; a pump is considered capable of controlling the quantity of fluid which flows

through the pump, and thus the connected piping system; a pump may be a "regulator valve"; alternatively, the fittings 30, 31, 35 and 36 are pipe fittings, which are passive valves and do control the quantity of fluid which may pass through, by nature of their cross sectional area);

a regulation device 46 operatively connected to the ventilator so as to control the ventilator according to the temperature detected by the temperature sensor (13A or 15; col. 5, line 55 – col. 6, line 1);

Fischer et al. in the above described embodiment (of fig. 2) fail to teach a regulator valve operatively connected to the regulation device, and fail to teach that the heat conveyance medium boils in the heat intake section 9A, or condenses in the heat output section 4', since the fluid cooling circuit outside of the box 4 in fig. 2 is a liquid cooling circuit and the water/glycol mixture does not normally undergo a phase change. Plattner does however teach in fig. 3 that a vaporizable refrigerant is used in place of the water/glycol mixture (col. 6, lines 6-8) but the embodiment of fig. 3 is an adsorption refrigeration cycle, and the medium does not condense when discharging heat to the heat sink, but rather condenses through adsorption (col. 6, lines 23-25). However, two-phase vaporization refrigeration cooling devices are known, as is their use on board aircraft (col. 5, lines 25-30 teach that in fig. 2, cooling plant 4 contains one such system).

Plattner teaches in fig. 1 a vaporization cooling device 14 with a compressor 24, condenser 12, expansion valve 20, and evaporator 22, where the heat conveying medium undergoes a phase change from liquid to gas in the evaporator and a change

from gas to liquid in the condenser as it flows through the system, (col. 2, lines 51-65); in fig. 2A-2B, the condenser 12 is shown mounted on the exterior skin of an aircraft (col. 3, lines 3-13: the condenser is mounted on an external surface, shown on a lower portion thereof, but capable of being mounted "in any location on the aircraft 16 that provides sufficient air flow while not impeding the function of the aircraft 16"); the condenser further comprises a ventilator 44. It would have been obvious to a person of ordinary skill in the art at the time of the invention to implement a vaporization cooling device as in Plattner in place of the liquid cooling system of Fischer et al. because of the greater cooling capacity of harnessing the phase change of the heat conveyance medium, and to use the skin air condenser of Plattner in place of the skin heat exchanger of Fischer et al., to utilize the temperature differential of the ambient air at cruise altitude whenever possible, to predictably conserve fuel relative to preferentially using a separate cooling device as a heat sink.

Particular to claim **19,** neither Fischer et al. nor Plattner explicitly teach a regulator valve operatively connected to the piping system and a regulation device, where the regulation device controls the valve according to the temperature detected by a temperature sensor. However, Fischer et al. do teach that the regulating unit 46 controls "the internal refrigeration loop in the cooling plant 4," and "the external cooling air flow through the cooling plant 4 by controlling the blower 15" according to information from a temperature sensor 45 (Fischer col. 5, line 55 – col. 6, line 1). If the regulation device controls the airflow through the plant 4 by controlling the fan 15, then it would have been within the knowledge of one skilled in the art to control the flow through the

piping circuit by having the regulation device control the pump 7. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the regulation device 46 control the pump 7 to control the quantity of fluid flow therethrough in response to information from the temperature sensor 45 for the purpose of having all controllable elements reactive to changes in temperature, to optimize the response of the system and maximize the cooling capacity of the device.

Regarding claim **20,** the piping system of Fischer et al. includes a closed pipe (the piping circuit is a closed circuit), one end section being the heat intake, and the other end being the heat output, whereby both sections are connected via the conveyance section (Fischer fig. 2: one end of the closed pipe circuit is at 9A, the heat intake, and the other end is at 4', the heat output, and conveyance 5, 5', 6, 6' connects the two).

Regarding claim **21,** the heat source of Fischer et al. includes an on-board kitchen in the aircraft (Fischer col. 3, line 63 – col. 4, line 4: galleys and food trolleys), which include surfaces requiring cooling.

Regarding claim **22,** Fischer et al. provide means for controlling the flow of the heat conveyance medium between the heat intake and output sections (Fischer et al. fig. 2: pump 7 is fully capable of controlling the flow of the medium throughout the circuit).

Regarding claim **25,** the ventilators 13A and 15 of Fischer et al. are operatively connected to the temperature sensor 45 and controlled in accordance with the temperature detected (Fischer et al. col. 5, lines 55 – col. 6, line 1).

Regarding claim **27,** Fischer et al. provide a cold storage unit between the heat source and the heat sink (Fischer et al. fig. 2: cooling unit 4 is located between the heat source 8A and the heat sink 41).

Regarding claim **28,** Fischer et al. provide a cold storage unit provided in the heat source (Fischer et al. fig. 2: the galleys 3A and 3B and trolleys 8A, 8B are quite literally cold storage units, in that they store cold food; in the sense that a particular element or medium is cold, and the trolleys may be considered as the storage unit inside the heat source of the galley proper, the air in circuit 12A or 12B will remain at its lowered temperature and provide some capacity as a heat exchanging medium for a period of time after the vaporization circuit shuts off; additionally, trolleys 8A contain food as taught by col. 3, lines 63-66, which food will remain cold for a portion of time even without operation of the cooling device).

Regarding claim **29,** the piping system of Fischer et al. forms a closed circuit which connects the heat source and the heat sink via a feed line 5 and a discharge line 6, respectively.

Regarding claim **30,** the cold storage unit 4 of Fischer et al. is located in a special circuit with a special piping system (col. 5, lines 25-42).

Regarding claim **31,** Fischer et al. show skin heat exchanger 41 mounted at the bottom of the aircraft when the aircraft is in rest condition, but Plattner allows for a skin condenser to be placed nearly anywhere (col. 3, lines 3-13) so long as it does not unduly affect operation of the aircraft, and in figures 7A-D, Plattner shows a similar embodiment to that of fig. 2 mounted on the top of an aircraft. It would have been

obvious to a person of ordinary skill in the art at the time of the invention to mount the skin condenser of Plattner on the top of the aircraft of Fischer et al. so that it was less likely to be damaged during take-off and landing by debris kicked up by the wheels and engines, or while grounded by maintenance crew.

Fischer element 4 is not shown to be located geodetically higher than the heat source (8A), however it is noted from Fischer col. 1, lines 26-32 that "food service items are generally cold-stored in catering transport containers, i.e. so-called trolleys", which trolleys are stowed in a galley; the trolleys 8A in fig. 2 are shown to be cold stored in galley 3A, and if galley 3A is considered as the cold storage unit (since it cold-stores the trolleys), then portions of the galley (the ceiling) are located geodetically higher than the trolleys themselves when the aircraft is in a rest condition, while other portions of the galley (the floor) are provided between the trolleys and the skin heat exchanger (see fig. 2).

Response to Arguments

Applicant's arguments filed 9/3/2009 have been fully considered but they are not persuasive.

Applicant argues (Remarks page 13, ¶ 2), that the ambient air of Kleen does not control the heat transfer and does not meet the required limitations for the claimed ventilator. However, the shutters 32 of the duct 31 do control the heat transfer.

Applicant argues (Remarks pages 14-17) against the combination of the patents to Fischer and Plattner. In these arguments, Applicant asserts that the water/glycol mix

of Fischer already has a relatively high cooling capacity, and that placing a phase change cooling system in Fischer would add weight to the aircraft. These arguments are not persuasive, since the cooling capacity of phase change cooling systems are generally known to be greater than that of non-phase change systems. Further, both systems are known to be used in aircraft for cooling food service trolleys, as Fischer states in col. 1, lines 43-46, and replacement of one known cooling system with another known cooling system would not require an inventive step. Nor is it persuasive that added weight would teach away from a combination, since every non-lifting component added to an aircraft adds weight without increasing lift, and yet aircraft manufacturers consistently include such components in aircraft. Decreasing weight is not the single goal of aircraft design, and it does not teach away from a combination to add weight to an aircraft in search of meeting another goal; in this case, that of increasing cooling capcity.

Applicant argues (Remarks page 17, ¶ 1) that the cooling plant 4 is not a cold storage unit since it does not store a reserve of heat conveyance medium. This argument is not persuasive since the term, "cold storage unit" is too broad to require such a limitation. Applicant has not relied upon or provided a definition of the term which requires this limitation.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard R. Green whose telephone number is (571)270-5380. The examiner can normally be reached on Monday - Thursday 8:00 am - 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Mansen can be reached on (571)272-6608. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. R. G./
Examiner, Art Unit 3644
/Tien Dinh/
Primary Examiner, Art Unit 3644